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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,898	10/01/2004	Hiroto Ohtake	Q83944	2975
23373 7590 06/27/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER HO, HOANG QUAN TRAN	
			ART UNIT 2818	PAPER NUMBER
			MAIL DATE 06/27/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/509,898

Applicant(s)

OHTAKE ET AL.

Examiner

Hoang-Quan Ho

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- and 5-18, and
- 4) ☒ Claim(s) 1-4, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) 5-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 19-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 3, 2007 has been entered.

Response to Amendment

Applicant's amendment dated March 5, 2007 in which claims 1 – 2, 4 and 20 were amended, no claim was cancelled, claims 5 – 18 were withdrawn, and no claim was added has been entered of record. Currently, claims 1 – 4 and 19 – 20 are pending in light of the amendment.

Response to Arguments

Applicant's arguments filed March 5, 2007 have been fully considered.

Applicant's arguments, see pgs. 7 – 12, with respect to the rejection of claims 1 – 4 and 19 – 20 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made below.

In response to Applicant's remarks at the last paragraph of pg. 8, the rejection of claims 3 – 4 were meant to refer to Ryukichi, and par. 0011 teaches those claimed limitations.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 – 4 are rejected under 35 U.S.C. 102(a) as being anticipated by Kanegae et al. (U.S. Patent App. Pub. No. 2002/0061654 A1), hereinafter as Kanegae.

Regarding claim 1, fig. 3 of Kanegae teaches a semiconductor device comprising:

an organic insulating film (ref. no. 104) having an opening (ref. no. 104a), wherein said organic insulating film has an insulated modified portion (vicinity of ref. no. 104b; also see figs. 21(a) – 21(c), ref. no. 710, par. 0305; ref. no. 710 is equivalent of ref. no. 104b, therefore will be considered equal and only reference to ref. no. 104b will be made hereinafter, however ref. no. 710 is still applicable) in a side of said opening (as seen in fig. 3), and-

said modified portions includes nitrogen atoms (par. 0163 – 0166, such as HCN or CN; also see figs. 5(a) – 7, where it also shows concentrations of nitrogen – N_{1s}).

Regarding claim 2, Kanegae teaches the semiconductor device according to claim 1, Kanegae teaches wherein said modified portion further comprises fluorine atoms (par. 0064 – 0065 and 0068 – 0070), and

a concentration of said fluorine atoms in said modified portion is lower than a concentration of said nitrogen atoms (see par. 0097 wherein nitrogen is used more for etching, therefore, nitrogen would be more than fluorine).

Regarding claim 3, Kanegae teaches the semiconductor device according to claim 2, Kanegae teaches further comprising:

a metal conductor (ref. no. 508, as seen in fig. 15(b)) whose main component is copper, formed in said opening.

Regarding claim 4, Kanegae teaches the semiconductor device according to claim 3, Kanegae teaches wherein said metal conductor is in direct contact with said modified portion (as seen in fig. 15(b)).

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 19 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanegae as applied to claim 4 above, and further in view of Shinichi (Japan Patent App. Pub. No. 2000-114367).

Regarding claim 19, Kanegae teaches the semiconductor device according to claim 4, but Kanegae does not teaches wherein the metal conductor comprises a barrier film whose main component is tantalum. However, drawing 5 of Shinichi teaches that it is known in the art to provide wherein the metal conductor (ref. no. 53) comprises a barrier film (ref. no. 52) whose main component is tantalum (par. 0002). Also see par. 0037. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the device of Kanegae with the barrier film of Kanegae, in order to prevent copper diffusing into the insulation layer (par. 0004). It is proper to combine Kanegae and Shinichi because they both teach about copper wiring in a semiconductor device.

Regarding claim 20, Kanegae and Shinichi teaches the semiconductor device according to claim 19, wherein the barrier film is in direct contact with the modified porition (as seen in combination with Kanegae's device as seen in fig. 3 and drawing 5

of Shinichi, wherein the insulating layer ref. no. 51 of Shinichi is equivalent to ref. no. 104 of Kanegae). Also to consider par. 0037 of Shinichi, since the barrier film ref. no. 15 consists Cu and Ta are formed in the opening, it is considered touching the modified portions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoang-Quan Ho whose telephone number is (571) 272-8711. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HQH/

Hoang-Quan Ho

Junior Examiner

June 18, 2007

STEVEN LOKE
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Steven Loke". The signature is written in a cursive, flowing style.